

Application No. 09/941,151
Amendment dated October 18, 2004
Pending Appeal

Amendments to the Specification:

Please replace the two paragraphs beginning on page 18, line 26, with the following amended paragraphs:

The person viewing the display can communicate feedback information regarding the suggested tooth positions and orientations toward which the teeth of the patient are to be moved by orthodontic treatment, which can include information of changes to the suggested tooth positions and orientations or information in the form of change data from an orthodontic practitioner indicating selected changes in the suggested tooth positions and orientations. For example, in viewing the calculated finish positions that are suggested by the computer 30b, the orthodontist 14 can adjust the positions of any of the teeth in six degrees of freedom on a computer at the orthodontist's office 11 which is connected to the computer 30b at the appliance design facility 13 through a telephone or wireless link or other network. Normally, an orthodontist first considers adjustments to the torque, tip and rotation angles of the teeth. The angle adjustments are made by selecting the angle and tooth to adjust in the table 76 (Fig. 5C) and then to adjust a slide control 76a or type in a new value for the angle to be adjusted. As the value changes, the display changes to reflect the change in the value being made. The orthodontist can also adjust any tooth in x,y,z coordinates or in gingival-occlusal, facial-lingual and mesial-distal coordinates. Rather than translating the entire tooth, which presents interference issues, the orthodontist might adjust particular landmarks. When the adjustments have been made by an orthodontist and a testing of the changes made is desired, the orthodontist selects the Calculate Setup button 77 to cause the computer 30b at the appliance design facility to recalculate the treatment positions of all of the teeth based on the changes made by the orthodontist. In doing so, the orthodontist can select or unselect, in check boxes 77a provided, the parameters that can be changed in the setup calculation. In this way, the orthodontist can also test extractions by selecting the elimination of selected teeth from the calculations, and may test over-corrections that the orthodontist might desire. The setup recalculations proceed according to the orthodontists selections to position the teeth in stable positions according to predetermined criteria stored in the computer 30b.

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The feedback information can include information approving tooth positions and orientations toward which the teeth of the patient are to be moved by the appliance. For example, when the tooth finish positions have been finally calculated following the iterations between the computer 30b and the orthodontist, the orthodontist communicates satisfaction with the treatment positions to the appliance design facility 13 and the operator thereat then commands the computer 30b, or the computer can be respond automatically, to design the appliance. In designing an appliance according to conventional straight-wire orthodontic appliance techniques, the appliance will be one made up of brackets to be bonded to the patient's teeth which support an interconnecting archwire. The straight wire appliance design proceeds with the design of an archwire, the design of brackets and the design of bracket placement jigs, all custom to the treatment plan approved by the orthodontist for the specific patient. The design of archwires can be carried out in accordance with the patents incorporated above, such as U.S. Patent Nos. 5,454,717 and 5,447,432. Archwire designing concepts such as those discussed in U.S. Patent No. 5,474,448, hereby expressly incorporated by reference herein, are also particularly suitable. Archwire design places an archwire 80 at an optimal low profile position relative to each of the teeth, as illustrated in Fig. 5E for the mandibular arch. The archwire 80 is designed to lie in an archwire plane *AWP* through the teeth when the teeth are in their posttreatment or finish positions, as illustrated in Fig. 5F for a mandibular first bicuspid. Once the archwire 80 has been designed, brackets 81 are automatically designed by the computer 30b to form the connection between the archwire 80 and the patient's tooth, with the shape of the custom archwire 80 defining an archwire slot 82 in the bracket 81 and the three-dimensional data from the 3-D high resolution data file for the tooth defining the contour of the bracket mounting base 83. To facilitate the proper identification of the brackets to the teeth on which they belong, these bracket mounting bases are preferably shaped in accordance with the concepts described in U.S. Patent No. 5,993,206, hereby expressly incorporated by reference herein, with the bases thereof being scaled reductions of the profiles of the crowns of the teeth viewed from the facial side.